POPULATION MATTERS
A RAND Program of Policy-Relevant Research Communication
Center for Middle East Public Policy
RAND
Issue Paper

Population Growth in Egypt
A Continuing Policy Challenge

Mona Khalifa, Julie DaVanzo, and David M. Adamson

Recently, some Egyptian scholars have questioned the continuing need for government support of family planning programs. High fertility and population growth, they contend, are no longer serious concerns in Egypt.[1] Notwithstanding President Hosni Mubarak's public expressions of support for family planning policies[2] and recent increases in the government spending for family planning programs, there is evidence of complacency among some policymakers and scholars regarding the need to reduce fertility and population growth rates. For instance, it is widely believed that current engineering projects designed to increase the amount of arable land will relieve the consequences of high population density in the Nile Valley,[3] further reducing the need to reduce birth rates.

One statistic commonly cited as evidence that population growth is no longer a pressing policy concern is the declining fertility rate. Egypt's total fertility rate (TFR) has fallen from 7.2 children per woman in the early 1960s to 3.4 in 1998. United Nations population projections suggest that the TFR in Egypt will decrease to three children in the 2000–2005 period and to two children by 2020–2025.[4]

However, deeper examination of current trends suggests that population growth should still concern Egyptian policymakers. If the fertility declines of recent decades are to be sustained and the government of Egypt is to achieve its goal of reducing fertility to replacement level by 2016,[5] it must support a strong family planning program that can continue to provide high-quality services and reach more potential users. Financing this program will increasingly depend on the Egyptian government's resources.

Using existing demographic research, this paper examines demographic trends and their implications for Egypt. It addresses three questions:

- What are current population challenges in Egypt?
- How will addressing these challenges benefit Egypt?
- What are the future challenges?

THE POPULATION OF EGYPT WILL CONTINUE TO GROW FOR MOST OF THE TWENTY-FIRST CENTURY

Egypt's population still grows each year by approximately 1.5 million (see Figure 1) people, or the equivalent

---

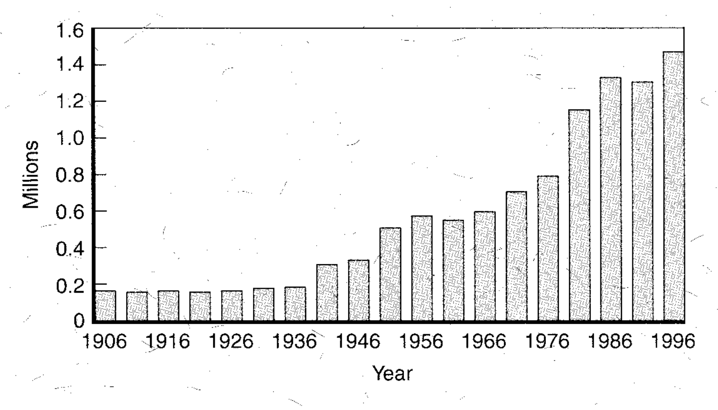
[1] Sobhi El Hakim, "The Truth of the Population Problem in Egypt," public lecture delivered at Cairo University, 1999.

[2] President Mubarak continues to regard moderating population growth as an important issue. On May 6, 1999, he formed a ministerial committee on population to oversee controlling population growth. On September 16, 1999, in his election speech to the nation, President Mubarak said that population growth is an important issue: "It is true that we are planning for land reclamation and that the rate of population growth has declined, but this is not enough."

[3] Abdel Magid Farrag, "Toshki and the Ten Commandments," in *Al Ahram* (the daily official newspaper), January 27, 1999.

[4] United Nations Department of Economic and Social Affairs, Population Division, *World Population Monitoring*, New York: United Nations, 1997.

[5] *The National Population Strategy*, National Population Council, Cairo, 1991. Replacement-level fertility is just over two children per woman.



SOURCE: United Nations (Population Division, Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: the 1998 Revision*).

Figure 1—Additions to Egyptian Population (in selected years)

of the population of a country the size of Kuwait. United Nations projections indicate that the population will grow from 62.3 million in 1995 to 95.6 million by 2026 and will reach 114.8 million before it stabilizes in the year 2065—an increase of approximately 84.4 percent over the current total. This increase will occur for two reasons: fertility rates are still high in many parts of Egypt, and momentum will cause the population to continue to increase even after fertility rates reach replacement level.

Fertility Rates Are Still High

According to the total fertility rate in 1998, the average Egyptian woman would give birth to 3.4 children in her lifetime—well above the rate needed to reach population stabilization. Fertility rates are especially high in the poor rural areas of Upper Egypt, which are least able to support rapid population growth. A third of Egypt's population and nearly half of the Egyptian poor reside in Upper Egypt.[6] Rural Upper Egypt has the lowest annual GDP per capita in the country (£E 2,353 in 1994–1995, compared to £E 3,461 for the country as a whole[7]) and the highest infant mortality rate (68.5 infant deaths per 1,000 live births, compared to 50.4 for the country as a whole[8]), and the average woman will give birth to 4.5 children in her lifetime.[9] This region is especially likely to have its socioeconomic development hampered by high fertility rates.

High fertility can impose costly burdens on Egypt: As discussed in more detail below, it can hinder economic development, increase health risks for women and children, and erode the quality of life by reducing access to education, nutrition, employment, and scarce resources, such as potable water.

Population Momentum Will Also Contribute to Population Growth

Even after the country reaches replacement-level fertility—just over two children per woman— the population of Egypt will continue to grow for a number of years. This is because of population momentum. Momentum occurs when a large proportion of women are in the childbearing years. When this is the case, the total number of births can increase even though the rate of childbearing per woman falls. Momentum is a powerful demographic force; it is predicted to account for about half of Egypt's population growth over the next 100 years. The sooner fertility rates are reduced, the smaller will be the number of people added to the population through momentum.

The share of reproductive-age women (15–49) was 23.1 percent of the total population of Egypt in 1986 and increased to 25.7 percent in 1996. This number is expected to rise to 26.5 percent of the total by 2025. This large proportion of women in the reproductive ages means that the number of annual births is likely to increase, to 1.8 million, by 2010.

Figure 2 shows two population projections to demonstrate the effect of population momentum over a period of 40 years (1996–2036). The top line shows the size of the population if the total fertility rate of 3.6 in 1995 contin-

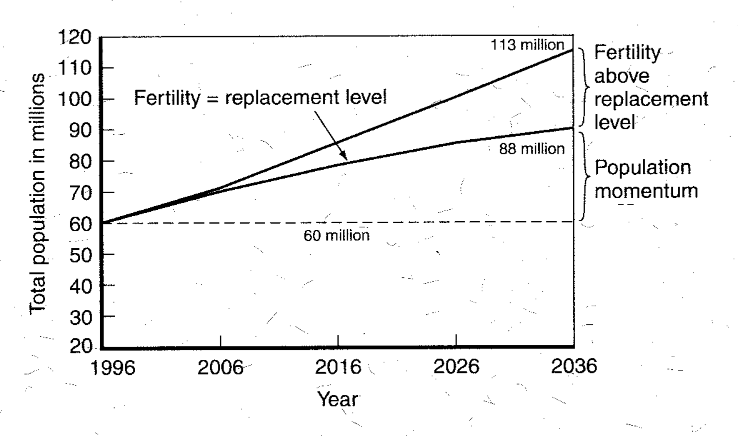


Figure 2—Projected Population Growth in Egypt, 1996–2036

[6] Institute of National Planning, *Egypt Human Development Report, 1996*. Egypt is composed of six demographic regions: Urban Governorates: four governorates all classified as urban and inhabited by 18.6 percent of the total population; Urban Lower Egypt: urban areas in the Nile delta and inhabited by 12 percent of the total population; Rural Lower Egypt: rural areas in the Nile delta and inhabited by 31.6 percent of the total population; Urban Upper Egypt: urban areas around the Nile south of Cairo and inhabited by 11.6 percent of the total population; Rural Upper Egypt: rural areas around the Nile south of Cairo and inhabited by 24.9 percent of the total population; Frontier Governorates: the governorates on the borders of Egypt and inhabited by 1.4 percent of the total population.

[7] *Egypt Human Development Report, 1996*. One Egyptian pound (£E) = approximately U.S. $0.29.

[8] *Demographic and Health Survey, 1998.*

[9] Fertility data are from the *Demographic and Health Survey, 1998.*

ued. In this case the total population would reach 113 million in 2036. The second line shows the result of achieving the target of the Egyptian government—i.e., reducing the total fertility rate to replacement level by 2016. In this case the population will continue to grow to 88 million. The increase from 60 million to 88 million is due to population momentum, while the rest of the increase to 113 million is due to a fertility rate exceeding replacement level.

Many Egyptian Women Want Greater Control over Reproductive Decisions

Around eight in ten married women in Egypt want no additional children or want to delay the next birth for at least two years.[10] Yet a sizable percentage of these women do not use contraception. Data from the Egypt Demographic and Health Survey (DHS) in 1998 suggest that the percentage of Egyptian women of reproductive age who want to limit family size or have no more children but are not using contraception is 16 percent. This is a sizable number of women and represents the target group that family planning programs are trying to reach. The gap between stated preference and actual behavior is a measure of what demographers label the "unmet need for contraception," which refers to the behavior of women who want no more children or want to delay their next pregnancy but do not use contraception. Demographers categorize unmet need in two types: a need for birth spacing and for limiting family size. As shown in Figure 3, the unmet need for contraception is especially high in rural Upper Egypt, where nearly a quarter of women of reproductive age say they want no additional children or want to delay the next birth for at least two years but are nonetheless not using contraception.

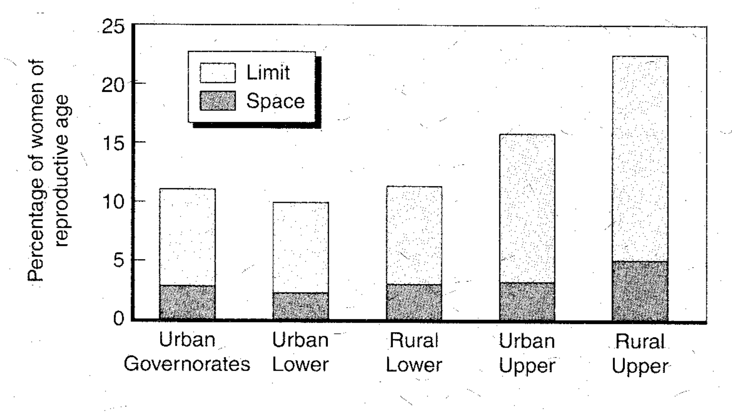


Figure 3—Unmet Need for Family Planning, for the Five Major Regions of Egypt

[10] Enas Mansour and Faten Abdel Fatah, "Profile of Women with an Unmet Need for Family Planning from a Child Survival Perspective," in *Perspectives on the Population and Health Situation in Egypt*, National Population Council and Demographic and Health Surveys, Macro International, Inc., 1998.

Furthermore, a number of Egyptian women are having more children than they consider optimal. The 1995 DHS reports for the period 1990–1995 a total fertility rate of 3.65 children per woman and a rate of wanted fertility of 2.6.[11] That is, in 1990–1995 each woman aged 15–49 on average had one unintended child.[12] More than a third of the children born in 1990–1995 in rural Lower Egypt resulted from unintended pregnancies.

ENABLING WOMEN TO ACHIEVE REPRODUCTIVE PREFERENCES WILL BENEFIT EGYPT

Enabling women to achieve their reproductive preferences will increase their age at the first birth, increase the spacing between their births, reduce the number of unintended pregnancies, reduce fertility rates, and decrease the rate of population growth. These changes in turn will yield benefits for individual women and their families and for the country as a whole.

Reduced Risk of Maternal Mortality and Morbidity and Fewer Abortions

Reductions in fertility can reduce the risk of mortality and morbidity associated with childbirth, a risk magnified by many successive pregnancies. Maternal mortality in Egypt is high. In 1992 a national survey reported a maternal mortality rate of 174 maternal deaths per 100,000 live births (compared to rates of 6 per 100,000 in Canada and 12 per 100,000 in the United States).[13] The large number of births occurring annually (over 1.5 million) means that more than 200 maternal deaths occur each month, or about seven per day.

Maternal mortality and morbidity can also be reduced by enabling women to delay first births until age 20 or later and to space births at least two years apart. Women are more likely to die or suffer serious injury during pregnancy or childbirth when pregnancies occur before age 20 or occur very close together.

Reducing the incidence of unintended pregnancy will reduce the number of unsafe abortions, which may follow such pregnancies, and in so doing reduce the maternal morbidity and mortality associated with these abortions. Abortion in Egypt is illegal except when medically necessary. A recent study by the Population Council has shown that approximately one out of five patients of the obstetrics / gynecology department of public-sector hospitals

[11] El Zanaty and Associates and Macro International, Inc., *Egypt Demographic and Health Survey, 1995*, National Population Council and Macro International, Inc., 1996.

[12] *Demographic and Health Survey, 1995.*

[13] Ministry of Health, Child Survival Project, *National Maternal Mortality Study, Egypt 1992–1993*, 1994.

were admitted for treatment of postabortion complications. The findings suggest that approximately 28,000 women seek postabortion treatment in Egypt in public-sector hospitals each month.[14]

Improved Health for Children

Lower fertility produces healthier children. Closely spaced children (less than two years apart), children with many siblings, and children born either to younger or older mothers are all more common at higher levels of fertility and all face higher mortality risks.[15] The majority of married women in Egypt (77 percent) have the potential of giving birth to a child at elevated risk of mortality. Children born less than two years apart are twice as likely to die in the first year of life as those born after an interval of at least two years (Figure 4). Furthermore, closely spaced pregnancies are more likely to result in low-birth-weight (LBW) babies. Such babies have a substantially greater likelihood of dying in the first year of life; those who survive are more likely to suffer developmental impairments later. Furthermore, treating LBW babies is expensive. A pilot study in Qalyoubia (a governorate in Lower Egypt) revealed that birth interval from the last pregnancy was the most striking risk factor for low birth-weight. Infants born with a birth interval of less than one year from the previous pregnancy had a LBW incidence of 31.4 percent, compared to only 15.4 percent for those with a longer interval.[16] Finally, close spacing also interferes with breastfeeding, which plays a vital role in child nutrition and in building the child's resistance against infectious disease.

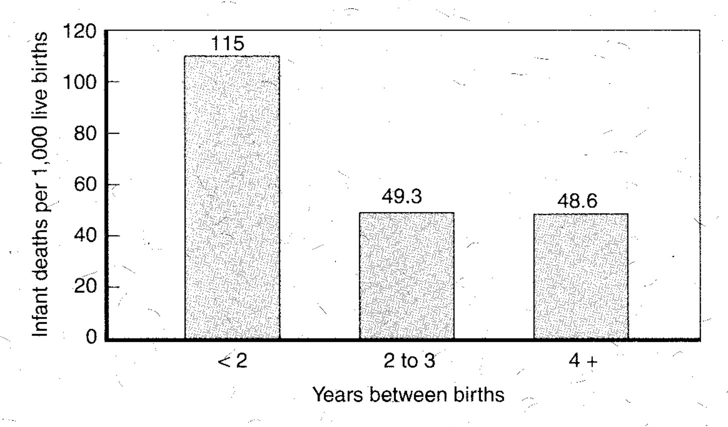


Figure 4—Infant Mortality Rates by Length of Previous Birth Interval, Egypt 1998

Improved Life Options for Women

Allowing women more control over their fertility can enhance their choices in settings where educational and economic opportunities are expanding. For example, the major reason behind the high dropout rate among Egyptian schoolgirls is economic.[17] Families with inadequate incomes and large numbers of children are more likely to withdraw their children from school. Moreover, if the family's economic circumstances are so difficult that only some children can be educated, girls—older girls in particular—are likely to be withdrawn from school first so that they can help care for younger siblings.[18] Girls from larger families and from less educated families are especially likely to be caring for younger siblings. A recent study in Alexandria examined the relationship between family size, the level of education of the father, and gender equity in child care. It showed that 52 percent of girls from large, less literate families spent time caring for younger siblings, compared with only 15 percent for girls from smaller, low-literacy families (and only 5 percent for girls from smaller, more literate families).

Recent efforts have aimed to provide basic education to deprived groups through establishing Single Class Schools. The focus is on primary school dropouts to enable them to achieve literacy. Women who have many children are less able to take advantage of these educational opportunities.

Reduced Burdens on Schools

Reducing the proportion of school-age children in the population reduces the burden on schools. Reducing child dependency also allows families and nations to invest more in education, improving the quality of the future labor force. A recent projection estimated that there would be 3.8 million fewer primary students in 2026 if current fertility trends continue than there would be if the fertility rate were to remain at its current level.[19] This change could reduce the primary class size, which was 44 per class in 1994–1995, and combined with increases in

14 Population Council, "Postabortion Case Load Study in Egyptian Public Hospitals," 1997.

15 In Egypt, the Child Survival Project identified high-risk newborns through the four "toos." These are

- too young: mother less than 18 years old,
- too old: maternal age over 40,
- too many: five or more births, and
- too soon: less than 24 months since the last delivery.

16 Ministry of Health, Child Survival Project in Cooperation with USAID, "Low Birth Weight, Qalyoubia Governorate," Egypt, 1995.

17 Institute of National Planning, *Egypt Human Development Report, 1996.*

18 Nora Guhl Naguib, "Who's Absent from Egyptian Schools? An Update on Gender Differences in Education," in *Perspectives on the Population and Health Situation in Egypt*, National Population Council and Demographic and Health Surveys, Macro International, Inc., 1998. Seham Ragheb, "Family Size and Gender Equity in Child-Rearing," National Population Council and University of Alexandria, 1998.

19 *Moving Forward*, POLICY Project, March 1999.

public expenditure should lead to improvements in the quality of education.

Reduced Pressures on the Environment and Public Services

Achieving the fertility-reduction goal of the Egyptian government, i.e., reaching replacement-level fertility in 2016, will reduce pressures on the environment and provide a grace period for dealing with other kinds of pressures. The projections comparing continued fertility decline with the situation if such decline does not take place estimate that by 2026 per capita income would be 18 percent higher than it would be if fertility remained at its current level.[20] As a result of a lower population growth rate, 2.4 million fewer new jobs would have to be created for the new entrants into the labor force over the entire period.

A reduced rate of population growth would provide the opportunity to provide such public services as piped water and sanitation to a greater number of households. In 1995, 17 percent of households in the country (and 44 percent in rural Upper Egypt) did not have access to piped water.[21]

Population trends will also have a significant impact on the amount of water available per person in the future. The aforementioned projections show that, at the current level of fertility, the annual amount of water available per person would be reduced to nearly half of today's levels by 2026—falling from 980 cubic meters per person per year today to 570 by 2026. However, the available amount would drop only to 670 cubic meters if reduced fertility is achieved, which would allow each person to consume 100 extra cubic meters, or 18 percent more water per year. The standard yearly requirement for water consumption per person is 1,000 cubic meters.[22] Given that more than 90 percent of Egypt's water supply originates outside its borders, reducing water consumption could also reduce the harmful effects of disruptions in supply.[23]

The results of efforts in the past two decades to increase the amount of cultivated land lagged behind population growth.[24] The average individual's share of cultivated land fell from 3.1 carats in 1981 to 2.7 carats in 1994.[25] Agricultural projects in Egypt aim to increase the area of cultivated land by about 50 percent during the next 20 years. If fertility remains at its current level, however, the per capita share of cultivated land will also remain at today's level. The projects designed to increase the area of land on which the Egyptian population lives from 5.5 percent of the total area to 25 percent in the next 25 years are expected to relieve high population density in the Nile Valley. However, this relief will not be available in the short term.

Economic Benefits

Another way in which lower fertility can promote socioeconomic development is by reducing the proportion of dependent children in the population. At present, children under age 15 constitute 24 percent of the total population of Egypt. Reducing fertility to replacement level by 2016 will reduce this percentage to 21 percent. On the other hand, continuing at the present fertility level will raise the proportion of children to 30 percent of the total population in 2016. A lower ratio of children to adults will reduce the current dependency ratio (that is, the proportion of children under 15 and older people over 60 compared with the number of population in the age group 15–60) from 0.71 to 0.40.

With fewer children, families will have more disposable income to save or invest. This constitutes a "demographic bonus," which may help to spur economic growth, create jobs, and in turn reduce unemployment. In 1995, the unemployment rates were 31.5 and 11.8 percent among secondary school and university graduates respectively.[26] However, some caution is in order when drawing connections between lower fertility and socioeconomic development. The "demographic bonus" is not automatic but depends on appropriate policy in other areas. Savings must be spent wisely.

FACING THE FUTURE

The decreases in fertility that have occurred in Egypt since 1965 attest to the success of family planning and related efforts to improve the education of women.[27] The reduction in fertility from 7.0 children per woman in 1965 to 3.4 in 1998 was accompanied by an increase in the con-

---

[20] *Moving Forward*, POLICY Project, March 1999.

[21] Institute of National Planning, *Egypt Human Development Report, 1996*.

[22] See Nichiporuk, *Security Dynamics of Demographic Factors*, RAND MR-1088, 2000, pp. 23 ff., for a discussion of these issues and further references.

[23] Peter H. Gleick, "Water and Conflict: Fresh Water Resources and International Security," *International Security*, Vol. 18, No. 1, Summer 1993, pp. 79–112, cited in Nichiporuk, op. cit.

[24] Institute of National Planning, *Egypt Human Development Report, 1996*.

[25] Institute of National Planning, *Egypt Human Development Report, 1996*.

One carat = 175 square meters.

[26] Institute of National Planning, *Egypt Human Development Report, 1996*.

[27] Ibrahim Khodair Osheiba, "Fertility in Egypt: An Analysis of Proximate Determinants and Socio Economic Determinants," Cairo Demographic Center, Working Paper No. 34, 1993.

traceptive prevalence rate (the percentage of married women of reproductive age who use contraception) from 7 percent to 51.7 percent. Egypt's family planning program has led to sharp increases in the use of a variety of contraceptive methods, including intrauterine devices, birth control pills, and condoms. A major contributor to this achievement has been the comprehensive support from the U.S. Agency for International Development (USAID) since the early 1970s. Operations research and other studies sponsored by USAID have played a major role in shaping program operations and interventions.

To achieve the government's goal of reducing fertility to replacement level by 2016, it will be necessary to increase contraceptive prevalence to 70 percent.[28] Most of this increase can be achieved by meeting current unmet need, estimated in 1998 to be 14.5 percent of all women. However, meeting current total demand for contraception (which equals the 51.7 percent current users plus the 14.5 percent who have an unmet need for contraception—see Figure 5) would only increase contraceptive prevalence to 66.2 percent. Program efforts will face a challenge in reaching an additional 3.8 percent of women who do not currently express a desire to space or limir their births.

Strategies to Reach Couples with Unmet Contraceptive Needs Have Not Been Fully Implemented

Operations research and data such as those collected by the DHS have shed light on the reasons why, in spite of not wanting to have another child (soon), a number of Egyptian couples are not practicing contraception. This research has shown that the three main barriers that Egyptian women most commonly cite as reasons for not using contraception are concerns about side effects/health problems, concerns about having to have a vaginal examination, and difficulty in getting the money to pay for contraception.[29] The government has begun addressing these barriers by introducing a wider variety of methods as well

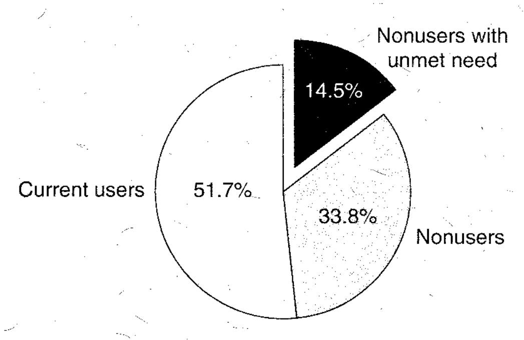


Figure 5—Contraceptive Use and Unmet Need Among Egyptian Women

[28] *Moving Forward*, POLICY Project, March 1999.

as promoting wider knowledge about proper contraceptive use and low health risks, improving the quality of counseling services, encouraging employment of female physicians in family planning clinics, and increasing access to contraception and subsidizing contraceptives. Furthermore, efforts are under way to integrate family planning and counseling into postpartum care, design information/education/communication (IEC) programs emphasizing the health benefits of family planning, educate women about the sources of family planning services available in their community, and address misperceptions about contraceptive methods.[30]

A Sizable Cohort Is Now Reaching Childbearing Age

Egypt has an extremely young population. According to the 1996 census, 46 percent of the population was 20 years of age or younger, up from 42.7 percent in 1960. Nearly 13.3 million females were under age 20, and about one-third of them were in Upper Egypt. By 2020, 14.3 million women will be in the prime childbearing ages of 20–40, compared with 9.2 million in 1999. It also means that population growth will be highest in the poorest regions of Egypt. The number of women of childbearing age will continue to increase before it gets smaller. This means that the family planning program will need to serve a larger number of people. (Even if contraceptive prevalence rates and fertility preferences don't change, a greater number of women will be wanting to practice contraception, and the number with unmet need will be larger as well.)

Access to Contraception Is Also Important for Reducing Unintended Pregnancies and Unsafe Abortions

Even in regions where fertility is relatively low, access to contraception is still important because it can help reduce unwanted pregnancies and the unsafe abortions that sometimes follow them. As noted above, unintended pregnancy is still prevalent in many parts of Egypt (especially those where fertility rates are relatively low), and there are many unsafe abortions.

The Population Council study mentioned above found that less than 3 percent of the postabortion patients in public-sector hospitals were counseled about family planning.[31] As those women leave the hospital, they become once more subject to the risk of an unwanted pregnancy

[29] *Egypt In-Depth Study on the Reasons for the Nonuse of Family Planning*. National Population Council and Demographic and Health Surveys, Macro International, Inc., 1997.

[30] Ibrahim Kodair Osheiba, "Fertility in Egypt: An Analysis of Proximate Determinants and Socio Economic Determinants," Cairo Demographic Center, Working Paper No. 34, 1993.

[31] Population Council, "Postabortion Case Load Study in Egyptian Public Hospitals," 1997.

and another abortion. It is clear that repeated abortion causes a heavy burden on the health and well-being of Egyptian women. This finding also suggests that scarce medical resources are being used to treat a condition that could be avoided through provision of family planning services.

Current Projections Assume Continued Success of Family Planning

Current population projections assume that fertility will drop—that is, that family planning programs will continue to increase the use of contraception. Therefore, if family planning programs do not continue their success, the projections will not be met and the actual population size in the future will be greater than expected.

THE CHALLENGES AHEAD

Family planning programs have enjoyed widespread success and popularity in Egypt. However, the continued levels of unmet need for contraception in several areas of Egypt and the increase in the number of women reaching childbearing age indicate that the work of family planning is not finished. Current trends suggest that Egyptian family planning programs need to strengthen efforts to meet unmet need and to provide more explicit links between contraceptive services and postabortion counseling to reduce unintended pregnancies and the need for abortion.

However, the current policy climate raises concerns about the future of family planning in Egypt. The Ministry of Health and Population is shifting to a more integrated approach to women's health.[32] This shift may be misinterpreted by some scholars and by the public as a shift away from family planning. There is a need to emphasize among health care providers that effective family planning contributes to women's health. Effective use of contraception can reduce the need for some kinds of maternal health care, including postabortion care after unsafe termination of unintended pregnancies, which would allow focusing of scarce medical resources on other medical needs.

Program funding and management may also be at a crossroads. USAID has been the largest contributor to Egypt's population-assistance programs since 1975. USAID's population assistance to Egypt, including family planning, will face gradual reduction during the next ten-year period. The United Nations Population Fund (UNFPA), which has also been an important supporter of the Egyptian program, recently faced sharp reductions in support from the United States and as a consequence is unlikely to maintain its past levels of support. Given the uncertainty of future donor funding levels, Egypt must be prepared to assume a greater share of the burden and anticipate playing a larger role in program operations. The Egyptian government needs to intensify its efforts to make this transition happen smoothly. These efforts, with cooperation from the private sector and nongovernmental organizations as partners, will be required to build upon the prior success of family planning programs.

32 The USAID FY 1998 congressional presentation. Available at http://gopher.info.usaid.gov/pubs/cp98/ane/countries/eg.htm

Mona Khalifa is the head of the Department of Demography at the Institute of Statistical Studies and Research at Cairo University, Egypt, and consultant to the POLICY project. Julie DaVanzo is director of the *Population Matters* program and a senior economist at RAND. David M. Adamson is communications director for the *Population Matters* program and a communications analyst at RAND.

This work was carried out in RAND's Labor and Population program by the *Population Matters* project, which is supported by funding from the William and Flora Hewlett Foundation, the David and Lucile Packard Foundation, and The Rockefeller Foundation. *Population Matters* project publications and other project information are available at http://www.rand.org/popmatters. The authors wish to acknowledge the valuable comments and suggestions from our technical reviewers. RAND is a nonprofit institution that helps improve policy and decisionmaking through research and analysis. To obtain information about RAND studies or to order documents, contact Distribution Services (Telephone: 310-451-7002; FAX: 310-451-6915; or Internet: order@rand.org). Abstracts of all RAND documents may be viewed on the World Wide Web (http://www.rand.org). RAND® is a registered trademark.

RAND

1700 Main Street, P.O. Box 2138, Santa Monica, California 90407-2138 • Telephone 310-393-0411 • Fax 310-393-4818
1200 South Hayes Street, Arlington, Virginia 22202-5050 • Telephone 703-413-1100 • Fax 703-413-8111
Newtonweg 1, 2333 CP Leiden, The Netherlands • Telephone 011-31-71-524-5151 • Fax 011-31-71-524-5191

IP-183 (2000)